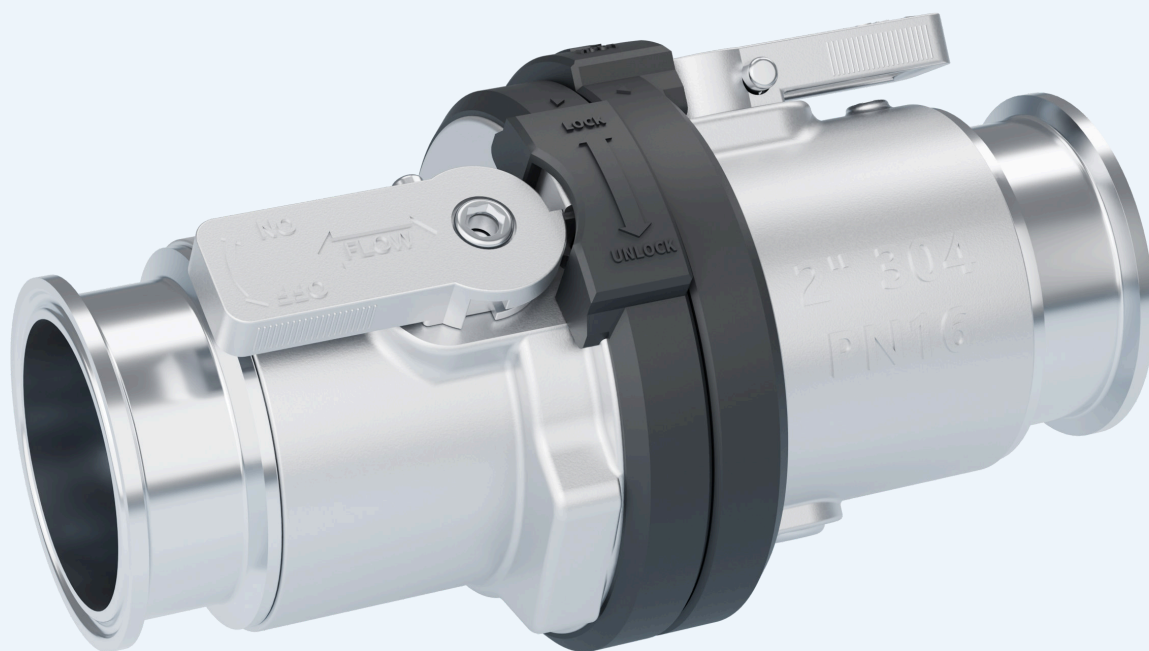


PRECISION FLUID CONNECTIONS

液冷连接系统

Liquid Cooling Connection Systems



以干式互锁球阀为核心

Dry-break interlock. At the core.

工程设计 · 精密铸造 · 加工装配 · 项目验证

Engineering · Investment casting · Machining & assembly · Project validation

01 / NPLUS AT A GLANCE

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一个主打平台，六类连接产品

One flagship platform. Six connection families.

重点展示 NP83 干式互锁球阀，并协同 EPDM 软管、安全卡箍、UQD/UQDB、卫生级阀门及定制管件。

NP83 leads the portfolio, complemented by EPDM hose, safety clamps, UQD/UQDB, sanitary valves and custom fittings.

01 / COMPANY

专注精密流体连接制造

Built around precision fluid connections

楠加敏科面向液冷基础设施，开发与制造流体控制及连接部件。以干式互锁球阀为主打，协同软管、卡箍、快接和卫生级配件，围绕实际工况组织选型与交付。

Nplus develops and manufactures fluid-control and connection components for liquid-cooling infrastructure. Our flagship dry-break interlock platform is supported by hoses, safety clamps, quick disconnects and sanitary components - configured around the application.



企业与生产环境
Company and production environment



精密加工生产区域
Precision machining area

工程评审

Application engineering

从介质、压力、温度与接口要求开始，明确设计边界。

Start with the fluid, pressure, temperature and interface requirements.

制造协同

Manufacturing integration

衔接精密铸造、机加工、清理与装配工序。

Coordinate investment casting, machining, cleaning and assembly.

文件化交付

Documented delivery

按项目确认图纸、检验与追溯文件范围。

Agree drawings, inspection scope and traceability records for each project.

为系统连接任务，定义产品配置

The connection task defines the configuration.

支持 AI 数据中心、HPC / GPU 集群、CDU、机柜歧管及服务器液冷连接需求。

Supporting AI data centers, HPC / GPU clusters, CDUs, rack manifolds and server liquid-cooling loops.

从系统位置开始选型

One cooling architecture. Defined connection tasks.

先识别连接在系统中的位置，再定义隔离、快拆、软管布置与端部匹配要求。

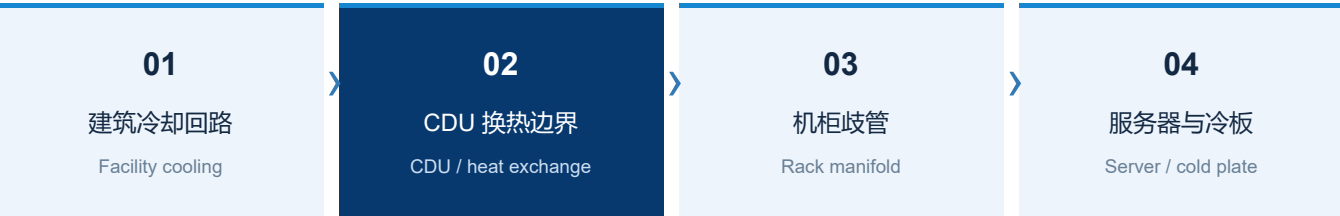
Identify the service point first. Then define the isolation, disconnection, hose routing and interface requirements.

一次侧与二次侧，通过 CDU 换热边界分开

Primary and secondary loops meet at the CDU heat exchanger.

以下示意图描述连接产品的应用位置，不代表两个回路中的冷却液直接混合。

The diagram shows where connection products fit; it does not imply direct fluid mixing between the two loops.



连接任务 Connection task	产品组合 Product family	评审重点 Review focus
主回路维护隔离 Mainline service isolation	NP83 干式互锁球阀 NP83 dry-break interlock	隔离顺序、残压与操作空间 Isolation sequence, residual pressure, access
柔性输送与固定 Flexible transfer and retention	EPDM 软管 + RK 卡箍 EPDM hose + RK safety clamp	弯曲半径、外径与端部配合 Bend radius, hose OD, fitting match
机柜与模块快拆 Rack and module service	UQD / UQDB UQD / UQDB	配合接口、密封与连接状态 Mating interface, seals, connection state
支路与定制接口 Branch and custom interfaces	卫生级阀门与管件 Sanitary valves and fittings	流道、安装尺寸与洁净要求 Flow path, installation geometry, cleanliness

系统示意仅用于应用沟通。具体回路设计、运行安全与维护隔离由系统集成方确认。
Architecture shown for application discussion. The system integrator defines the circuit design, operating safeguards and service isolation.

02 / FLAGSHIP PLATFORM

NP83 干式互锁球阀

NP83 Dry-Break Interlock Ball Valve

面向主回路与可维护连接点，将球阀隔离与机械互锁整合在同一连接平台。

A connection platform that brings ball-valve isolation and mechanical interlocking together for mainline and serviceable fluid connections.



NP83 连接状态外观示意
NP83 connected-state product rendering

16 bar

参考工作压力 / 232 psi
Reference working pressure / 232 psi

NPS 1 / 2 / 3

参考规格系列
Reference nominal-size family

EPDM / PTFE

密封配置选项
Seal configuration options

受控隔离

Controlled isolation

以双侧关断状态作为解锁分离的必要条件。

Both valve halves must be closed before unlocking and separation.

图片为产品外观渲染，材料、密封与铭牌按具体订单配置确认。

Product renderings illustrate appearance. Materials, seals and markings are defined by the specific order configuration.

全流道理念

Full-flow architecture

针对低限制流路布局，具体流量与压降按配置评审。

A direct flow-path concept; flow and pressure-drop data are configuration-specific.

配套集成

Assembly integration

结合软管、卡箍及端部接口，形成可维护连接组件。

Integrate the valve with the required hose, clamp and end interfaces.

02 / NP83 OPERATING PRINCIPLE

可理解、可确认的互锁顺序

A defined sequence for controlled disconnection



外部三角标记对齐
External alignment indicators



关闭后的分离状态示意
Separated state with both valves closed

01 对接与锁合

Align and engage

确认两侧阀门关闭；对齐接口，旋转至对接限位，并核对外部标记。

Keep both valves closed. Align the interfaces, rotate to the docking stop and confirm the external indicators.

02 依次开启

Open in sequence

按下手柄按钮，将一侧手柄转动 90° 至开启限位，再开启另一侧。

Press the handle button and rotate one handle 90° to its open stop, then open the other valve.

03 关闭两侧阀门

Close both valves

先关闭一侧，再关闭另一侧；任何一侧仍开启时，连接保持互锁。

Close one valve, then the other. The connection remains interlocked while either valve is open.

04 解锁与分离

Unlock and separate

两侧完全关闭并满足系统隔离要求后，反向旋转连接并分离。

After both valves are fully closed and system isolation requirements are satisfied, reverse the coupling rotation and separate.

必须双侧关闭，才可解锁分离。请勿强行操作互锁机构。

Both valves closed before release. Never force or bypass the interlock.

90° 指手柄行程，不是连接体对接角度。本页为工作原理概述，现场操作以确认的产品说明书及系统安全规程为准。

90° refers to handle travel, not the coupling docking angle. This is an operating-principle overview; follow the approved product instructions and system safety procedure.

结构与材料，为工况服务

Construction and materials for the application



外部手柄与机械互锁结构
External handle and mechanical interlock features

部位 / 设计项 Component / feature	参考配置 Reference configuration	应用关注点 Application focus
阀体与卡盘 Body and ferrules	316L	耐蚀性、介质适配与材料追溯 Corrosion resistance, fluid compatibility, material traceability
连接机构 Linkage	304	装配状态与重复操作配合 Assembly condition and operating fit
密封体系 Seal system	EPDM / PTFE	温度、介质及浓度 Temperature, fluid and concentration
球阀流道 Ball-valve flow path	全流道结构理念 Full-flow design concept	按实际流量核对压降 Review pressure loss at the required flow
外部互锁 External interlock	关闭后解锁 Close-before-release	不可用来替代系统压力管理 Does not replace system pressure management

表中材料为参考配置，渲染图仅表示外观；最终 BOM、材料与密封由确认图纸和订单技术协议定义。
The table defines reference material options; renderings illustrate appearance only. The approved drawing and order specification define the final BOM, materials and seals.

02 / NP83 TECHNICAL DATA

清晰定义技术边界

A clear reference envelope

以下技术参数同时提供公制与英制参考，便于项目选型和接口评审。所列数值不替代特定配置的压力-温度额定表。

Metric and U.S. customary reference values support project selection and interface review. They do not replace the pressure-temperature rating for a specific configuration.

参数 Parameter	参考值 Reference value	项目确认事项 Project confirmation
工作压力 Working pressure	16 bar / 232 psi	具体口径、材料与温度组合 Specific size, material and temperature combination
评估压力 Assessment pressure	24 bar / 348 psi	方法、介质、保压时间与判据 Method, medium, hold time and acceptance criteria
温度范围 Temperature range	-20 to +80°C / -4 to +176°F	密封选项与介质兼容性 Seal option and fluid compatibility
参考规格 Reference sizes	NPS 1 / 2 / 3	最终流道及连接尺寸见图纸 Final bore and connection dimensions per drawing
阀体 / 卡盘 Body / ferrules	316L	订单材料要求与材料证明 Order material requirements and documentation
连接机构 Linkage	304	具体结构与表面要求 Specific construction and surface requirements
密封 Seals	EPDM / PTFE	介质浓度、温度及清洗要求 Fluid concentration, temperature and cleaning requirements
端部 End connections	多种配置 Multiple configurations	接口标准、方向与安装空间 Interface standard, orientation and installation clearance

压力评估不是爆破额定值

Assessment pressure is not a burst rating.

具体试验记录、流量系数、残液量和循环寿命请按型号及项目需求索取或约定，不以示意图代替实测证据。

Request or agree model-specific test records, flow coefficients, retained-fluid data and cycle-life validation. Product illustrations are not performance evidence.

02 / NP83 CONFIGURATION

端部接口与定制配置

End connections, defined at the interface

先定义管路接口，再确定产品端部。相同的公称规格不代表所有标准的接口可以直接互换。

Define the mating interface before choosing the end connection. A shared nominal size does not make different interface standards interchangeable.

快装卡盘

Clamp-end interfaces

明确卡盘外径、密封面、垫片与配套卡箍。

Specify ferrule OD, sealing face, gasket and mating clamp.

软管宝塔

Hose-barb interfaces

联合确认软管内外径、插入深度和固定件。

Review hose ID and OD, insertion length and retention hardware.

螺纹接口

Threaded interfaces

明确螺纹标准、内外螺纹与实际密封方式。

Specify thread standard, gender and the intended sealing method.

定制过渡

Custom transitions

根据装配空间和配合件定义转接结构与尺寸。

Define transition geometry around the mating component and installation space.

提交资料 Input to provide	确认输出 Configuration output
配合端图纸与接口标准 Mating drawing and interface standard	确认连接图与尺寸版本 Approved connection drawing and dimensional revision
介质、浓度、温度与压力 Fluid, concentration, temperature and pressure	材料与密封配置 Material and seal selection
流量、管径与维护空间 Flow, line size and service clearance	产品规格与安装布置 Product size and installation arrangement
检验、标识与包装要求 Inspection, labeling and packing needs	项目验收与交付范围 Project acceptance and delivery scope

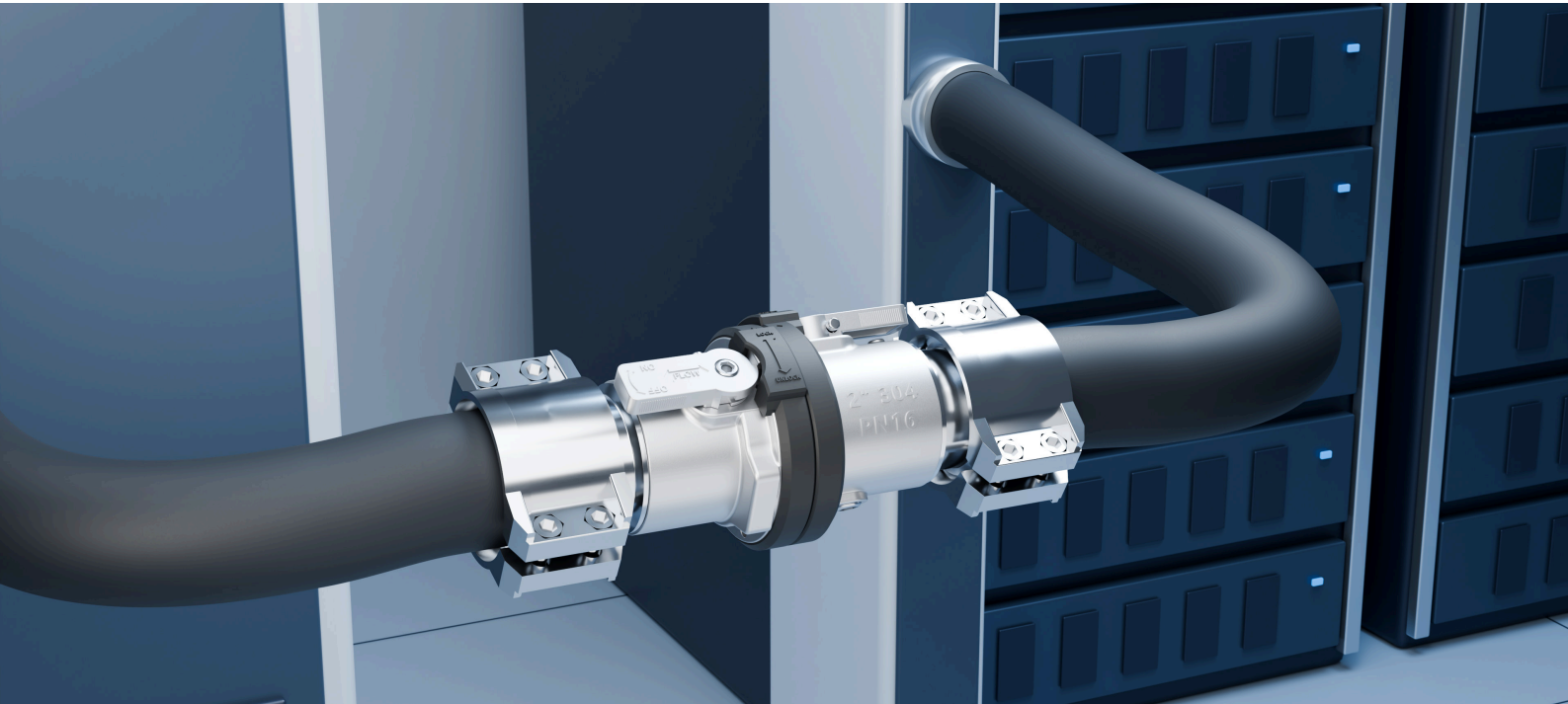
NPT、BSPP、ORB 等端部名称必须落实到具体标准、尺寸与确认图纸，不作为互换性声明。

End-interface names such as NPT, BSPP and ORB require a specific standard, size and approved drawing; they do not constitute an interchangeability claim.

02 / NP83 APPLICATION

把维护要求，带入连接设计

Design the connection around the service task



NP83、黑色 EPDM 软管与分体螺栓卡箍的应用示意
Application rendering with NP83, black EPDM hoses and split bolted clamps

预留操作空间

Provide operating access

保留手柄行程、连接旋转与分离空间，避免线缆或结构遮挡。

Allow for handle travel, coupling rotation and separation without structural or cable interference.

管理外部载荷

Control external loads

软管应有合理支撑，避免扭转、侧向拉力或过小弯曲半径。

Support hoses to limit torsion, transverse loading and excessively tight bends.

安排维护边界

Define service isolation

拆卸前执行系统隔离与残压管理，考虑积液收集与再投运检查。

Apply system isolation and residual-pressure controls, with provisions for fluid collection and restart checks.

干式断开，不等于无需维护风险评审

Dry-break service still requires a defined maintenance procedure.

介质、温度、残压和相邻部件决定现场维护条件；禁止将互锁作为唯一的系统安全措施。

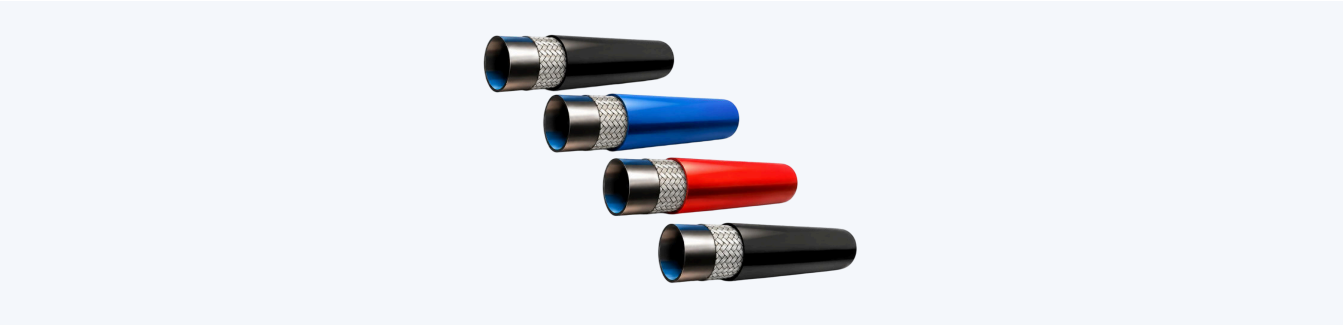
Fluid, temperature, residual pressure and adjacent components determine service conditions. The interlock is not the only required system safeguard.

03 / CONNECTION PORTFOLIO

EPDM 液冷软管

EPDM Liquid-Cooling Hose

面向 CDU、机柜歧管与服务器回路，兼顾柔性布管、冷却液输送与维护连接。
Flexible coolant routing for CDUs, rack manifolds and server loops, with construction and size selected for the service conditions.



NLH-EP 系列 | 软管结构与外覆层配置
NLH-EP series | Hose construction and cover configurations

选型项目 SELECTION ITEM	参考配置 REFERENCE CONFIGURATION
结构 Construction	黑色过氧化物硫化 EPDM 内管；单层纤维编织；合成橡胶外覆层 Black peroxide-cured EPDM tube; one fiber braid; synthetic-rubber cover
内径 / 包装 ID / packaging	1/4-1 in; 600-150 ft 卷盘 1/4-1 in; 600-150 ft reels
温度范围 Temperature	-40 to +100°C / -40 to +212°F
压力参考值 Pressure reference	150 psi / 10.3 bar; NLH-EP-16 为 100 psi / 6.9 bar 150 psi / 10.3 bar; NLH-EP-16: 100 psi / 6.9 bar
介质 / 真空 Media / vacuum	去离子水、水/乙二醇、空气; 15 inHg (-04 至 -12) DI water, water/glycol, air; 15 inHg (-04 to -12)
外覆层参考 Cover reference	UL 94 V-0

按尺寸选型

SIZE-SPECIFIC SELECTION

确认内径、外径与布管空间。
Confirm ID, OD and available routing space.

工作压力按具体规格选择；外覆层阻燃等级为选型参考，适用证明文件应按型号及订单要求确认。
Select working pressure by size. The cover flammability classification is a selection reference; confirm applicable documentation for the model and order requirements.

匹配端部组件

MATCH THE ASSEMBLY

软管、接头及卡箍协同选型。
Select hose, fitting and clamp as a matched assembly.

明确工况

DEFINE THE DUTY

提交介质、温度与压力条件。
Specify coolant, temperature and pressure conditions.

03 / CONNECTION PORTFOLIO

不锈钢安全卡箍

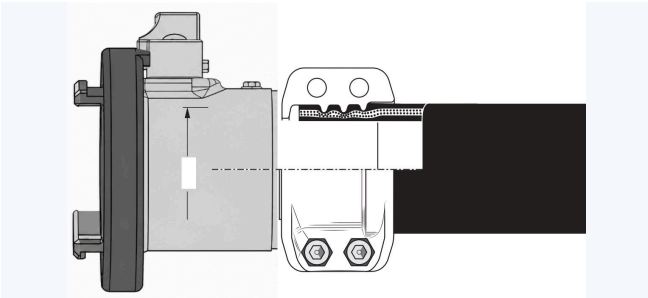
Stainless-Steel Safety Clamps

以受控机械锁紧连接软管与接头，支持检查和维护。本系列仅提供不锈钢版本。

A controlled mechanical interface between hose and fitting, designed for inspection and service. This portfolio is limited to stainless-steel variants.



NPRK 系列 | 不锈钢卡箍与软管组件
NPRK series | Stainless-steel clamps and hose assembly



组件接口示意
Assembly interface illustration

选型项目 SELECTION ITEM	参考配置 REFERENCE CONFIGURATION
卡箍本体 Clamp body	316 不锈钢参考配置 316 stainless-steel reference
配套紧固件 Hardware	A2 螺栓与螺母 A2 bolts and nuts
标准参考 Standard references	EN 14420-3 / DIN 2817
规格范围 Size range	ND 15-100
紧固件螺纹 Hardware threads	M6 / M8 / M10
内环选项 ID ring option	可选抛光不锈钢内环 Optional polished stainless-steel ID ring

以实测外径选型 MEASURE HOSE OD

按软管实际外径确认夹持范围。
Match the clamping range to the measured hose OD.

完整软管组件的适用范围需结合软管、接头与卡箍配置确认，不能仅依据卡箍公称规格判断。
Confirm suitability for the complete hose, fitting and clamp configuration, not solely from the nominal clamp size.

核对接头几何 VERIFY THE FITTING

确认接头轮廓与卡箍接口。
Check fitting geometry and the clamp interface.

核对材质与五金 CHECK MATERIALS

区分卡箍本体与紧固件等级。
Confirm body material and hardware grade separately.

03 / CONNECTION PORTFOLIO

UQD / UQDB 快速接头

UQD / UQDB Quick Disconnects

面向紧凑型机柜支路、模块更换与维护接口，通过按压式连接、颜色识别及双截止结构组织维护连接。

Compact connections for rack branches, module replacement and service interfaces, combining push-to-connect operation, color identification and double shutoff.



UQD / UQDB | 机柜与支路连接配置
UQD / UQDB | Rack and branch connection configurations

选型项目 SELECTION ITEM	参考配置 REFERENCE CONFIGURATION
尺寸体系 Size framework	4 种 OCP 参考尺寸 Four OCP-referenced sizes
温度范围 Temperature	5 to 65°C / 41 to 149°F
压力参考值 Pressure reference	典型 6.9 bar / 100 psi; 小规格最高 20 bar / 290 psi Typical 6.9 bar / 100 psi; smaller sizes up to 20 bar / 290 psi
密封参考 Seal reference	EPDM-P
端部选项 End options	ORB、BSPP、软管连接 ORB, BSPP and hose connections
连接结构 Interface	按压式连接; 平面密封; 双截止 Push-to-connect; flat-face; double shutoff

维护节点

SERVICE POINTS

机柜维护、模块更换、紧凑支路。

Rack service, module replacement and compact branches.

20 bar 为小规格参考，适用型号需单独确认。OCP 参考尺寸不等同于认证或任意品牌互换承诺。

Confirm model-specific applicability of the 20 bar smaller-size reference. OCP-referenced sizing is not a certification or a universal interchangeability claim.

颜色识别

COLOR IDENTIFICATION

红/蓝套筒与颜色标识 O 形圈。

Red/blue sleeves and color-coded O-rings.

配置核对

CONFIGURATION REVIEW

逐一核对规格、端接与密封。

Confirm size, end connection and seal configuration.

03 / CONNECTION PORTFOLIO

卫生级蝶阀与球阀

Sanitary Butterfly and Ball Valves

为液冷配套提供洁净流道隔离与可维护端部接口，并按介质、压力及连接形式确认阀门配置。

Sanitary butterfly and ball valves extend the cooling portfolio with clean-flow isolation, serviceable interfaces and application-specific end configurations.



卫生级阀门 | 蝶阀与球阀产品组合
Sanitary valves | Butterfly and ball valve portfolio

选型项目 SELECTION ITEM	参考配置 REFERENCE CONFIGURATION
工作压力 Working pressure	16 bar / 232 psi
评估压力 Assessment pressure	24 bar / 348 psi
温度范围 Temperature	-20 to +80°C / -4 to +176°F
通径参考 Bore reference	NPS 1 / 2 / 3
端部配置 End configurations	快装卡盘、焊接、螺纹及应用定制 Clamp, welded, threaded and application-specific ends

阀型选择

VALVE SELECTION

按隔离任务与安装位置选择。

Choose the valve type for the isolation duty and installation.

以上为选型参考边界，不代表所有阀型可同时达到全部上限。24 bar 为评估依据，不作为逐件试验记录。

These are selection reference limits; not every configuration achieves all limits simultaneously. The 24 bar assessment basis is not an individual product test record.

接口定义

INTERFACE DEFINITION

确认通径、端接与配套组件。

Define bore, ends and mating components.

密封匹配

SEAL REVIEW

结合介质与温度评审密封。

Review seals against the coolant and temperature.

03 / CONNECTION PORTFOLIO

卫生级管件与液冷定制

Sanitary Fittings and Custom Cooling Interfaces

从卫生级管件到软管转接与定制过渡件，将管径、端接、密封和表面要求转化为明确的连接接口。

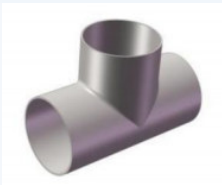
From sanitary fittings to hose adapters and custom transitions, define the tube size, connection, seal and finish around the cooling interface.



管件、卡盘、卡箍与密封组件
Tube, ferrule, clamp and gasket interface

接口组合

INTERFACE BUILDING BLOCKS



三通
Tee



大小头
Reducer

45° 短弯头、45° 长弯头、90° 弯头、三通、大小头、软管转接与活接组件。

45° short and long elbows, 90° elbows, tees, reducers, hose adapters and union assemblies.

选型项目 SELECTION ITEM	参考配置 REFERENCE CONFIGURATION
系列参考 Family references	3A / 45° / BPE / ISO / DIN
定制接口 Custom interface	管外径、端部连接、密封与表面要求 Tube OD, end connection, seal and finish
液冷配套 Cooling integration	EPDM 软管、UQD / UQDB、干式互锁阀 EPDM hose, UQD / UQDB and dry-break interlock valves
交付内容 Delivery scope	图纸、样件、检验及追溯要求 Drawings, samples, inspection and traceability requirements

定义接口

DEFINE

确认两端连接及安装尺寸。

Confirm mating interfaces and installation dimensions.

样件确认

VERIFY

通过图纸与样件核对配置。

Review configuration through drawings and samples.

受控交付

DELIVER

约定检验与文件要求。

Agree on inspection and documentation requirements.

系列名称用于产品与接口选型，不构成 3-A、BPE 或其他第三方认证声明；最终尺寸与要求以确认图纸为准。

Family designations support product and interface selection; they are not claims of 3-A, BPE or other third-party certification. Approved drawings govern final dimensions and requirements.

04 / MANUFACTURING

精密制造，从铸造开始

Precision starts before machining

从流道成形到最终装配，楠加将铸造装备、精密加工与产品接口设计相衔接，围绕图纸和应用要求组织制造。

From internal-passage formation to final assembly, Nplus connects casting equipment, precision machining and interface engineering around the drawing and application requirements.



机器人全自动制壳线
Robotic shell-building line



精密加工与零件制造
Precision machining and component production

从材料成形，到连接功能

From material formation to connection function



复杂内腔

Internal geometry

水溶芯与精密铸造装备，服务内部流道和复杂结构。

Water-soluble cores and casting equipment support internal passages and complex forms.

关键接口

Critical interfaces

通过后续机加工落实密封面、螺纹与装配尺寸。

Subsequent machining establishes sealing faces, threads and assembly dimensions.

组件配合

Assembly fit

以阀体、密封、紧固件和配合端的组合状态组织验证。

Verify the assembled relationship of bodies, seals, hardware and mating interfaces.

装备与工艺相连，工艺与图纸相连

Equipment supports the process. The drawing defines the part.

每个项目应明确材料、图纸版本、关键尺寸、外观及验收要求，形成可执行的制造与检验范围。

Define the material, drawing revision, critical dimensions, finish and acceptance requirements as an actionable manufacturing and inspection scope.

04 / CASTING EQUIPMENT

从水溶芯，到完整型壳

From soluble core to prepared shell

精密铸造装备展示 | 协同制造，衔接关键工序。

Investment casting equipment | A coordinated manufacturing platform.

01



16吨双工位水溶芯制芯机

16-Ton Dual-Station Water-Soluble Core Molding Machine

用于水溶芯成形，为内部流道及需要可去除型芯的复杂结构提供工艺基础。

Forms water-soluble cores used to create internal passages and other geometries that require removable core features.

02



自动蜡模清洗机

Automatic Wax Pattern Cleaning System

在制壳前清理蜡模表面，为后续涂挂工序做好表面准备。

Cleans wax pattern surfaces before shell building to prepare them for the subsequent coating process.

03



机器人全自动制壳线

Fully Automated Robotic Shell-Building Line

通过程序化搬运与涂挂作业，在模组表面逐层形成陶瓷型壳。

Applies ceramic shell layers to pattern assemblies through programmed handling and coating operations.

04



自动控制系统脱蜡釜

Automatically Controlled Dewaxing Autoclave

通过受控脱蜡循环去除陶瓷型壳内的蜡料，为后续热工处理做好准备。

Removes wax from ceramic shells using a controlled autoclave cycle, preparing the shells for subsequent thermal processing.

重点：几何准备与型壳状态

Focus: geometry preparation and shell condition

关注型芯及蜡模几何、表面清理、涂挂与干燥、脱蜡后型壳状态，衔接后续浇注工序。

Review core and pattern geometry, surface preparation, coating and drying, and shell condition after dewaxing before casting.

04 / CASTING EQUIPMENT

从热工成形，到铸后清理

From casting to surface preparation

精密铸造装备展示 | 协同制造，衔接关键工序。

Investment casting equipment | A coordinated manufacturing platform.

05



自动焙烧熔炼浇注

Automated Shell Firing, Melting & Pouring

配合型壳加热与金属浇注作业，将预制型壳转化为铸造零部件。

Supports coordinated shell heating and metal-handling operations for the conversion of prepared molds into cast components.

06



自动控制双腔焙烧炉

Automatically Controlled Dual-Chamber Firing Furnace

为陶瓷型壳焙烧及浇注前准备提供受控热处理循环。

Provides controlled thermal cycles for ceramic shell firing and preparation before casting.

07



双腔自动震壳机

Dual-Chamber Automatic Shell Knockout Machine

在铸后清理过程中去除铸件模组外部的陶瓷型壳。

Removes ceramic shell material from cast assemblies as part of the post-casting cleaning sequence.

08



五腔旋转抛丸机

Five-Chamber Rotary Shot-Blasting Machine

通过受控抛丸清理铸件表面，为后续精整与检验做好准备。

Cleans casting surfaces through controlled abrasive blasting before subsequent finishing and inspection.

重点：热工衔接与表面清理

Focus: thermal coordination and surface cleaning

焙烧与浇注按确认工艺衔接；震壳与抛丸完成铸后清理，后续再按图纸确定机加工与表面要求。

Coordinate firing and pouring through the approved process. Shell knockout and blasting prepare castings for subsequent machining and drawing-specific finishing.

让关键尺寸，落到连接界面

Precision where the components meet



机加工生产区域
Machining production area

把铸件转化为可装配、可密封的连接部件，需要围绕关键尺寸与配合面组织加工、清理和装配。
Turning a casting into an assembly-ready connection component requires machining, cleaning and assembly around the critical dimensions and mating surfaces.

制造关注点 Manufacturing focus	需要确认的要求 Requirements to define
基准与接口 Datums and interfaces	图纸版本、基准体系、螺纹及端部尺寸 Drawing revision, datum scheme, threads and end geometry
密封与配合 Sealing and fit	密封面、配合间隙及表面要求 Sealing faces, fit clearances and surface requirements
清理与保护 Cleaning and protection	毛刺、残留物、内腔清理与端部防护 Burs, residues, internal cleaning and end protection
装配与复核 Assembly and review	密封件识别、紧固件配置、操作与接口检查 Seal identification, hardware configuration, operation and interface checks

图纸驱动

DRAWING-DRIVEN

关键尺寸对应明确验收要求。

Link critical dimensions to defined acceptance criteria.

配置明确

CONFIGURATION-DEFINED

材料、密封与端部保持一致。

Keep materials, seals and ends aligned with the order.

面向装配

ASSEMBLY-FOCUSED

评审单件尺寸与组件配合。

Review both individual dimensions and assembled fit.

05 / QUALITY & DOCUMENTATION

明确要求，以记录支撑交付

Define requirements. Verify the evidence.

在生产前明确检查范围和判定标准，在交付时关联产品配置与检验记录。质量要求需要具体到型号、图纸和批次。

Define the inspection scope and acceptance criteria before production. At delivery, connect product configuration with the relevant records. Quality requirements should identify the model, drawing and production lot.

配置评审

CONFIGURATION REVIEW

材料、密封、端部、图纸版本及工况。
Materials, seals, ends, drawing revision and service conditions.

验证范围

VERIFICATION SCOPE

尺寸、材料、功能及约定的压力检查。
Dimensional, material, functional and agreed pressure checks.

追溯方案

TRACEABILITY PLAN

关联零件标识、炉批号与检验记录。
Link part identification, heat or lot numbers and inspection records.

交付放行

SHIPMENT RELEASE

标识、包装、随货文件与客户确认节点。
Identification, packing, accompanying records and customer review points.

按采购技术条件约定文件包

Specify the documentation package

文件 Document	建议明确的内容 Scope to agree
产品确认图 Approved product drawing	尺寸、材料、密封及接口版本 Dimensions, materials, seals and interface revision
材料证明 Material documentation	牌号、炉批次与产品的关联要求 Grade, heat/lot and product linkage requirements
检验记录 Inspection records	检验项目、方法、抽样与判定准则 Items, methods, sampling and acceptance criteria
压力 / 泄漏记录 Pressure / leakage records	配置、介质、压力、时间与结果 Configuration, medium, pressure, duration and result
交付文件 Release documents	装箱单、标签与约定的质量文件 Packing list, labeling and agreed quality records

文件、试验与见证范围以书面项目约定为准；本册中的产品图和设备照片不替代相应的合格评定记录。
Documentation, testing and witness scope are subject to written project agreement. Product renderings and equipment photographs do not replace qualification records.

05 / CUSTOM ENGINEERING

把应用需求，转化为连接方案

From application need to defined connection

从一个接口问题出发，将客户的系统边界转化为产品图纸、样件与交付要求。

Start with the interface challenge. Translate the system boundaries into a product drawing, sample and agreed delivery requirements.

01 应用定义

Application definition

提交介质、压力、温度、流量及维护场景，明确连接任务。

Provide fluid, pressure, temperature, flow and service conditions to define the connection task.

02 接口与配置

Interface and configuration

确认配合件、标准、材料、密封、安装尺寸与外观要求。

Confirm mating parts, standards, materials, seals, installation dimensions and finish.

03 图纸与样件

Drawing and sample review

确认图纸版本，通过样件检查装配、操作与系统适配。

Approve the drawing revision and review sample fit, operation and system integration.

04 验证计划

Verification plan

按风险与项目需求定义尺寸、功能、压力或其他适用验证。

Define dimensional, functional, pressure or other applicable checks for the project.

05 制造与交付

Manufacturing and release

按确认配置组织生产，并交付约定文件、包装与标识。

Manufacture to the agreed configuration and supply the specified records, packing and identification.

可定制，不等于跳过接口确认

Customization begins with a controlled interface.

端部转接、安装长度、材料及密封选项，应在图纸或技术协议中逐项确认。

Confirm end transitions, installation length, materials and seal options in the drawing or technical agreement.

05 / SELECTION MATRIX

六类产品，一个选型入口

A practical guide to the portfolio

按连接任务选择产品族，再根据实际配置核对压力、温度、材料及接口。
Choose the product family by connection task, then verify pressure, temperature, materials and interfaces for the actual configuration.

产品族 Product family	主要任务 Primary task	选型输入 Selection input
NP83 干式互锁球阀 NP83 dry-break interlock	主回路隔离与维护分离 Mainline isolation and service disconnection	规格、隔离顺序、介质与安装空间 Size, isolation sequence, fluid and service clearance
EPDM 液冷软管 EPDM liquid-cooling hose	柔性连接与冷却液输送 Flexible routing and coolant transfer	内外径、弯曲半径、温度与端部 ID/OD, bend radius, temperature and ends
RK 不锈钢卡箍 RK stainless-steel clamp	软管与接头的机械固定 Mechanical hose-to-fitting retention	软管外径、接头轮廓与紧固件 Hose OD, fitting profile and hardware
UQD / UQDB UQD / UQDB	紧凑支路与模块快拆 Compact branch and module service	配合接口、尺寸、密封及连接状态 Mating interface, size, seals and connection state
卫生级阀门 Sanitary valves	回路隔离与支路控制 Circuit isolation and branch control	阀型、通径、端部及密封 Valve type, bore, ends and seals
卫生级与定制管件 Sanitary and custom fittings	过渡、分流与定制接口 Transitions, branching and custom interfaces	图纸、管外径、端部与表面要求 Drawing, tube OD, ends and finish

按组件选型，而不只看单个零件

Select the assembly, not only the component.

完整连接的适用边界取决于阀门、软管、卡箍、密封和配合端的组合，并以经确认的组件配置为准。

The connection envelope depends on the combination of valve, hose, clamp, seal and mating end, as defined in the approved assembly configuration.

05 / PROJECT INQUIRY

让工程沟通，从关键信息开始

Build a better application brief

完整的应用资料，有助于减少反复确认，并形成更清晰的报价、配置与验证范围。

A complete application brief reduces clarification cycles and establishes a clearer quotation, configuration and verification scope.

介质与化学条件

FLUID & CHEMISTRY

介质名称、浓度、添加剂及清洗条件。

Fluid name, concentration, additives and cleaning conditions.

压力与温度

PRESSURE & TEMPERATURE

正常 / 最高压力、温度范围及瞬态工况。

Normal / maximum pressure, temperature range and transients.

流量与管路

FLOW & LINE GEOMETRY

目标流量、管径、软管内外径与空间。

Required flow, line size, hose ID/OD and available space.

接口与配合

ENDS & MATING PARTS

接口标准、连接形式、尺寸图或三维文件。

Interface standard, connection type, drawing or 3D model.

维护与使用

SERVICE & OPERATION

连接频次、隔离步骤、维护可达性。

Connection frequency, isolation steps and maintenance access.

交付与质量

DELIVERY & QUALITY

数量、样件、材料证明、检验与包装。

Quantity, samples, material records, inspection and packing.

发送需求与图纸

Send your brief and drawings

manager@nplustech.net

主题建议：项目名称 / 产品系列 / 目标规格

Suggested subject: Project / Product family / Target size

请在询价时列明强制性标准、第三方见证或认证要求，以便在承诺供货前完成评审。

Identify mandatory standards, third-party witnessing or certification requirements at inquiry so they can be reviewed before supply is confirmed.

06 / CONTACT NPLUS

连接工程，与您同行

Let's define your next connection

围绕您的液冷系统，定义下一处可靠连接。

Define the next connection around your cooling system.



温州楠加敏科流体控制有限公司

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EXPLORE NPLUS

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本册为企业及产品选型资料。最终供货配置、额定条件、图纸和质量文件以双方确认的订单技术要求为准。

This publication supports company and product selection review. Final supply configuration, ratings, drawings and quality documents are governed by the agreed order specification.